

## LEAF PULLINGS: A “NEW” WAY TO PROPAGATE *SARRACENIA* VEGETATIVELY

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### Introduction

All current methods of vegetative *Sarracenia* propagation involve dividing the rhizome. Rhizome division is often successful even if the division fragment does not have an apical growing point; in such cases a lateral node along the rhizome will usually be activated so that leaves (perhaps at first small and distorted) will be produced and a new plant will thus be established. No other methods of *Sarracenia* vegetative propagation are in practice.<sup>1</sup>

Oddly enough, hidden in the pages of an old 1978 issue of Carnivorous Plant Newsletter is a comment from Bill Scholl, relayed by the then-editor Joe Mazrimas. In this News & Views piece, Scholl claimed that *Sarracenia purpurea* could be propagated by rooting small, immature leaves dipped in rooting hormone. When I encountered this note, I was incredulous. As far as I knew, no current *Sarracenia* horticulturists used such a technique, and I strongly doubted it would actually work. However, it reminded me of a comment that Bob Hanrahan made as an aside in a cultivar description (Hanrahan, 2003); specifically, that *Sarracenia psittacina* could be propagated by leaf cuttings.

Could such a method actually work with *Sarracenia*? It seemed to me highly unlikely, since the technique seems not to have withstood the test of time. As a bit of armchair research, I reviewed my books on carnivorous plant cultivation, but found no reference to the use of *Sarracenia* leaves as a propagation method. While I have great respect for Scholl's and Hanrahan's contributions to our understanding and appreciation of carnivorous plants, I decided that the use of *Sarracenia* leaves to propagate plants was just not plausible.

However, I am a curious primate, so on a lark I decided to make sure that I was correct in my speculations. On 13 March 2004 I prepared several *Sarracenia purpurea* leaf pullings (I call them pullings instead of cuttings for reasons to be explained), tucked them into baggies, and ruefully consigned them to almost certain death.

In mid-April, I inspected the inhabitants of my leaf pulling baggies and was intrigued to see that the leaves were still alive. However, *Sarracenia* leaves are tough and tenacious, so I was not too surprised. I carefully extracted a few of the leaves from the soil, and goggled when I found that they had developed cauliflower-like calluses at their bases!

I exhumed the rest of the leaf pullings, and was aghast to see that several had produced roots! (See Figure 1) *Sarracenia* pitchers were not supposed to do this! In my amazement I showed the rooted leaves to comrades. When ICPS seed bank manager John Brittnacher saw the roots, his eyes glittered and he grinned. (For John, this is comparable to whooping with excitement; perhaps equivalent to Fernando Rivadavia hollering with delight over a field discovery.)

I returned the leaf pullings to their baggies and immediately expanded my experimentations to include other species. My optimism was tempered by caution, for while it was clear that I had managed to produce roots from *Sarracenia purpurea* leaf pullings, there was as yet no evidence that the rooted leaves would survive. Furthermore, even if the leaves did persist in a healthy state, I did not know if they ever would produce leaves. For example, *Hoya kirkii* leaves can be rooted, but the rooted leaves never develop any further plant parts; while interesting, rooted *Hoya kirkii* leaves have no propagation value.

On 23 May 2004, I reexamined the pots in my trials. This time the results were even more astounding. All the *Sarracenia purpurea* leaf pullings had developed roots, and two had begun to make pitchers! (See Figure 2) Furthermore, many of the new species prepared in mid-April showed a range of auspicious signs boding success. These leaf pullings included erect *Sarracenia*; I now had

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<sup>1</sup>In vitro techniques are not in the scope of this article.



Figure 1: Roots emerging from the base of *Sarracenia purpurea* var. *burkii*, four weeks after the leaf pulling was prepared. Photographed in mid-April by Barry Rice.



Figure 2: A tiny pitcher emerging from the base of *Sarracenia purpurea* var. *burkii*, eleven weeks after the leaf pulling was prepared. Photographed on 2 June 2004 by John Brittnacher.

evidence that the effectiveness of the technique was not limited to the ground-hugging species (*S. purpurea* and *S. psittacina*).

I have continued to observe the results of these experiments, and have continued to see successes. I have produced a number of healthy, rooted *S. purpurea* and *S. psittacina* plants with excellent root systems and vigorous leaf production. Root production on three of the erect trumpet pitcher species is also healthy, and I have observed leaf production on the *Sarracenia rubra* subsp. *wherryi*. The leaves on this latter species are most peculiar—the shoot extending from the base of the leaf pulling to the soil surface is transparent and covered with short scales. I believe this structure is the plant's resource-poor tactic to reach the soil surface.

### Details on the Technique

As you follow a *Sarracenia* pitcher down towards the rhizome, it becomes ever more narrow. Right at the point of attachment to the rhizome, the pitcher leaf flares and develops a clasping base that grips the rhizome. In order to prepare a successful leaf pulling, it appears to be essential to remove the entire leaf, including as much of the clasping base as possible. Do not cut the leaf off the rhizome—it must be pulled away. Do not use a razor or scalpel to slice off some rhizome with the leaf pulling. To do so might unnecessarily damage the rhizome, and expose it to invasion by pathogens (although it might increase the effectiveness of the technique—see note #4 in the next section).

The leaf tissue of very young pitchers is sometimes so tender that when you try to pull the leaf off, it snaps at the narrow point. *Sarracenia psittacina* is particularly prone to this frustrating tendency. I have found no value in such incomplete leaves, and experience has taught me to discard the leaves whenever this happens.

In order to make high quality leaf pullings, you may need to strip a few years' worth of dead leaves from the rhizome so you have room to work. It may also be necessary to hunt around a little to find a leaf that is easily removed. It does not seem to be necessary to use only young leaves—I have successfully used leaves that were still forming, leaves that were several months old (with a bit of dead crisping along the hood), and leaves at intermediate degrees of maturity.

The leaf pulling should be inserted into the soil so the leaf base is well-buried. I have not yet determined the ideal depth for insertion. I insert the leaf about 3 cm for the prostrate species, and approximately 5 cm for the erect species. The rationale for this insertion depth has merely been to ensure that the leaves are not easily knocked out of the rooting pots. The potting mix does not seem to be particularly crucial—while I have had the best results with dead long fiber *Sphagnum*, a 50:50 sand:peat mix has also been successful.

The potted leaf pullings should be placed in a sealed baggie with a bit of standing water (even if the plants are in a terrarium) as the leaf pullings are particularly susceptible to water loss. It is important to coddle the pitchers for the months required to produce new leaves. Otherwise, maintain normal growing conditions. The pitcher will slowly start to die from the leaf tip, but as long as the leaf base does not brown and rot, the leaf pulling is still potentially viable.

Roots should form within a month, and leaves should follow a month or two after that. When I observe that roots have been produced, I replant the leaf pulling so the young root system is closer to the soil surface—I believe it is best if the developing leaves can reach the surface as soon as possible. It seems that as long as roots are produced, leaves will be produced even though it may take a long time to do so. However, it apparently crucial that the plants be kept in a baggie until leaves are produced. Plants removed from baggies after root formation but before leaf formation have yet to succeed for me.

When I selected leaves for the erect species to be used in this experiment, I only chose leaves that were perhaps 25 cm (10 inches) or shorter. This was only to keep my experiment conveniently small. I do not know if full size pitchers (from erect species) will respond to the leaf pulling technique.

The success mileposts I have achieved in obtaining callus, root, and leaf formation for various taxa are given in Table 1. I do not provide success percentages for each plant, because these are only trial tests with about five leaf pullings per taxon (i.e. not enough to provide meaningful statistics!). In general terms, I have had nearly 100% success rates with *S. purpurea* and *S. psittacina*, but only about a 20% success rate with the other species. Clearly there is room for refining the technique.

Table 1: Leaf pulling success milestones

Plant	Callus	Roots	Leaves
<i>S. flava</i> var. <i>ornata</i>	Y <sup>1</sup>	N	N
<i>S. jonesii</i>	Y	Y	N <sup>2</sup>
<i>S. leucophylla</i>	Y	Y	N <sup>2</sup>
<i>S. minor</i> var. <i>minor</i>	N	N	N
<i>S. oreophila</i>	Y	Y	N <sup>2</sup>
<i>S. psittacina</i>	Y	Y	Y
<i>S. purpurea</i> <sup>3</sup>	Y	Y	Y
<i>S. rubra</i> subsp. <i>wherryi</i>	Y	Y	Y

<sup>1</sup>Leaf pulling died prior to root formation.

<sup>2</sup>Leaf pulling still alive, but this stage has not yet been reached as of November 2004.

<sup>3</sup>Included clones of *S. purpurea* subsp. *purpurea* var. *burkii* and *S. purpurea* subsp. *purpurea* var. *burkii* f. *luteola*.

### Summary Comments and Further Work

It is remarkable how much promise this procedure holds for *Sarracenia* propagation.<sup>2</sup> Now that we know this is possible, many modifications must be investigated. Questions foremost in my mind are the following:

1) Is the best practice to bury the pitchers vertically, as I have done? While this induces root formation with great efficiency, I suspect that the rate of leaf formation would be enhanced for the various erect trumpet species if the pitchers were buried at an angle (perhaps horizontally, just beneath the soil surface).

2) Is it possible to simply root the pitchers in water?

3) Is it possible to use phyllodia for leaf pullings?

4) Would this method have a higher success rate if a small bit of rhizome tissue were nicked off with the leaf pulling?

5) Does the success of leaf pullings depend upon seasonality? My leaf pullings were all done in the spring. Are late summer or winter leaf pullings possible?

6) Is it possible to root the small rhizome scales produced near the end of each growing season?

7) Do rooting hormones increase the success rates?

8) Is this method effective with *Heliamphora* and *Darlingtonia*?

It may be that ultimately the leaf-pulling method will be proven to be efficient and reliable only for propagating the prostrate species (*Sarracenia psittacina*, *S. purpurea*). Even so, since these two species are so loath to divide naturally in cultivation, the leaf-pulling method is an excellent way to propagate slow-to-divide specimens.

The time is overdue, the charge is clear—it is time to explore this simple and effective method of vegetative propagation!

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### References:

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<sup>2</sup>Perhaps only more remarkable is that this technique has essentially been forgotten by *Sarracenia* horticulturists!